SIEMENS

MOBILETT Plus HP

SP

Wiring Diagram

From serial No. 30200

SPR8-220.051.01.05.02

English
08-00

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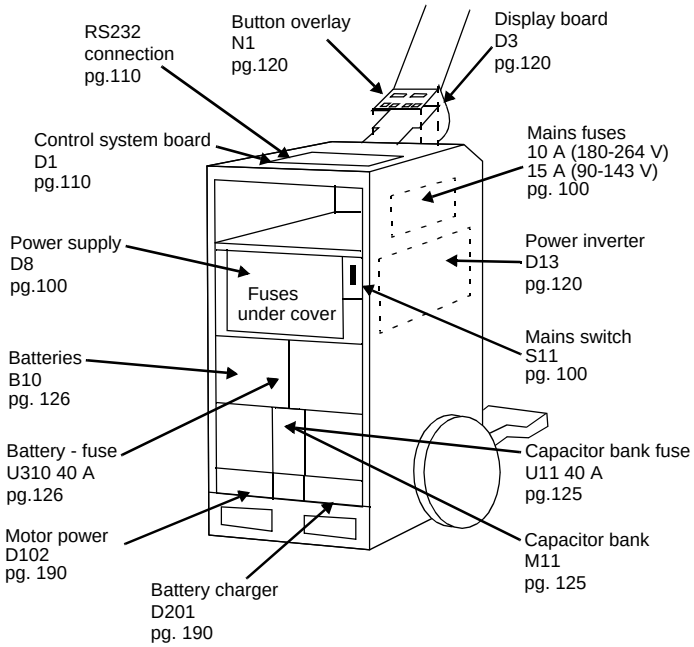
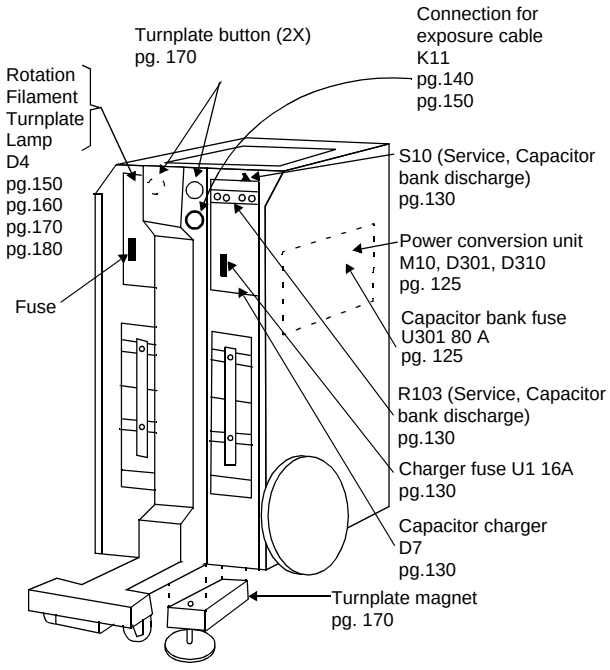
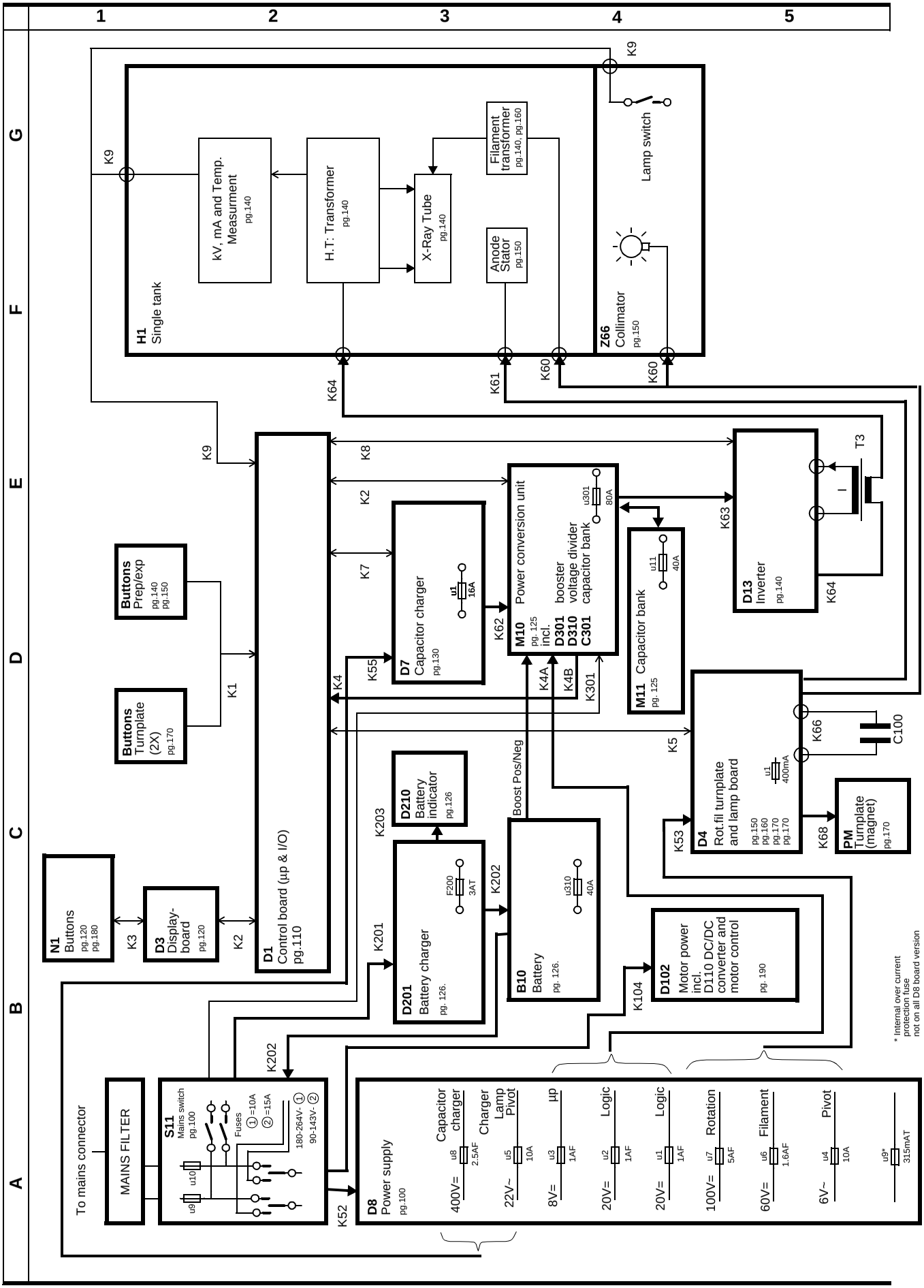
Notes on block diagram

* The block diagram supports troubleshooting on board level, not on component level.
* The function on D1, control board, described in sheet with number above 110 shows the common function of hard- and software.
  The circuits are only models and do not necessarily exist physically.


RS232 connection pg.110
Button overlay N1 pg.120
Display board D3 pg.120
Control system board D1 pg.110
Mains fuses 10 A (180-264 V) 15 A (90-143 V) pg. 100
Power supply D8 pg.100
Fuses under cover
Power inverter D13 pg.120
Mains switch S11 pg. 100
Batteries B10 pg. 126
Battery - fuse U310 40 A pg.126
Capacitor bank fuse U11 40 A pg.125
Motor power D102 pg. 190
Capacitor bank M11 pg. 125
Battery charger D201 pg. 190


Turnplate button (2X) pg. 170
Connection for exposure cable K11 pg.140 pg.150
Rotation Filament Turnplate Lamp D4 pg.150 pg.160 pg.170 pg.180
S10 (Service, Capacitor bank discharge) pg.130
Power conversion unit M10, D301, D310 pg. 125
Fuse
Capacitor bank fuse U301 80 A pg. 125
R103 (Service, Capacitor bank discharge) pg.130
Charger fuse U1 16A pg.130
Capacitor charger D7 pg.130
Turnplate magnet pg. 170

Block diagram system-cable-fuses



List of boards

No.	Name	Part No	Type No	On sheet
D1	Control board	6447531	X037E	20, 100, 110, 120, 130, 140, 150, 160, 170, 180
D3	Display board	6167170	X037E	20, 100, 110, 120, 180
D4	Rotation, inverter, filament, lamp and turnplate board *	6077106	X037E	20, 100, 110, 150, 160, 170, 180
D7	Capacitor charger *	6077247	X037E	20, 100, 110, 130
D8	Power supply *	6077353	X037E	20, 100, 130, 150, 160, 170, 180
D13	HT-inverter *	6508654	X037E	20, 100, 110, 140
D102	Motor power *	6508571	X037E	20, 190
D110	DC/DC converter *	6447390	X037E	20, 190
D201	Battery charger *	6508522	X037E	20, 126
D210	Battery indicator	6447424	X037E	20, 126
D301	Booster	6451525	X037E	20, 100, 110, 125
D310	Voltage divider	6447309	X037E	20, 125

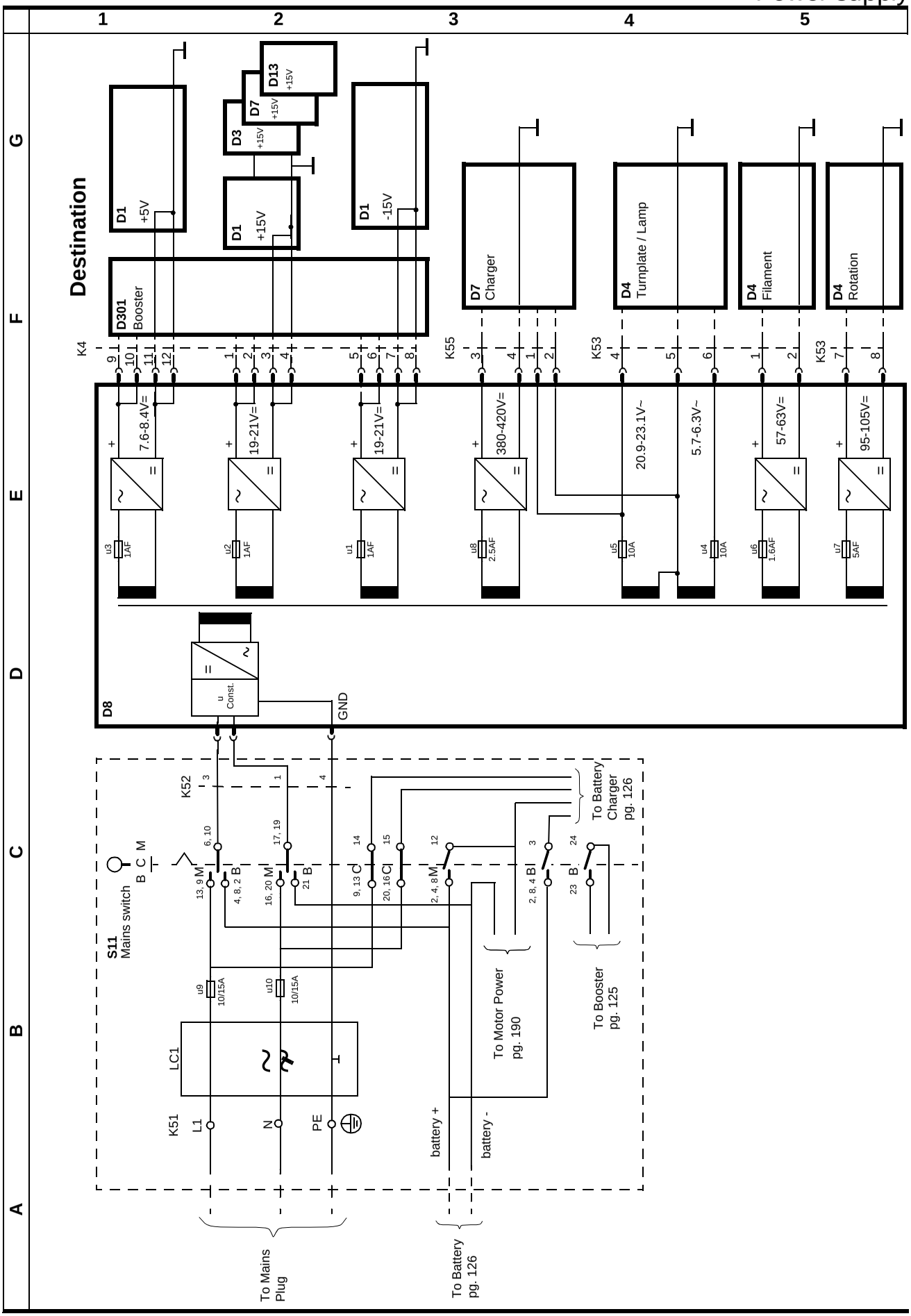
* Complete unit with heat zink

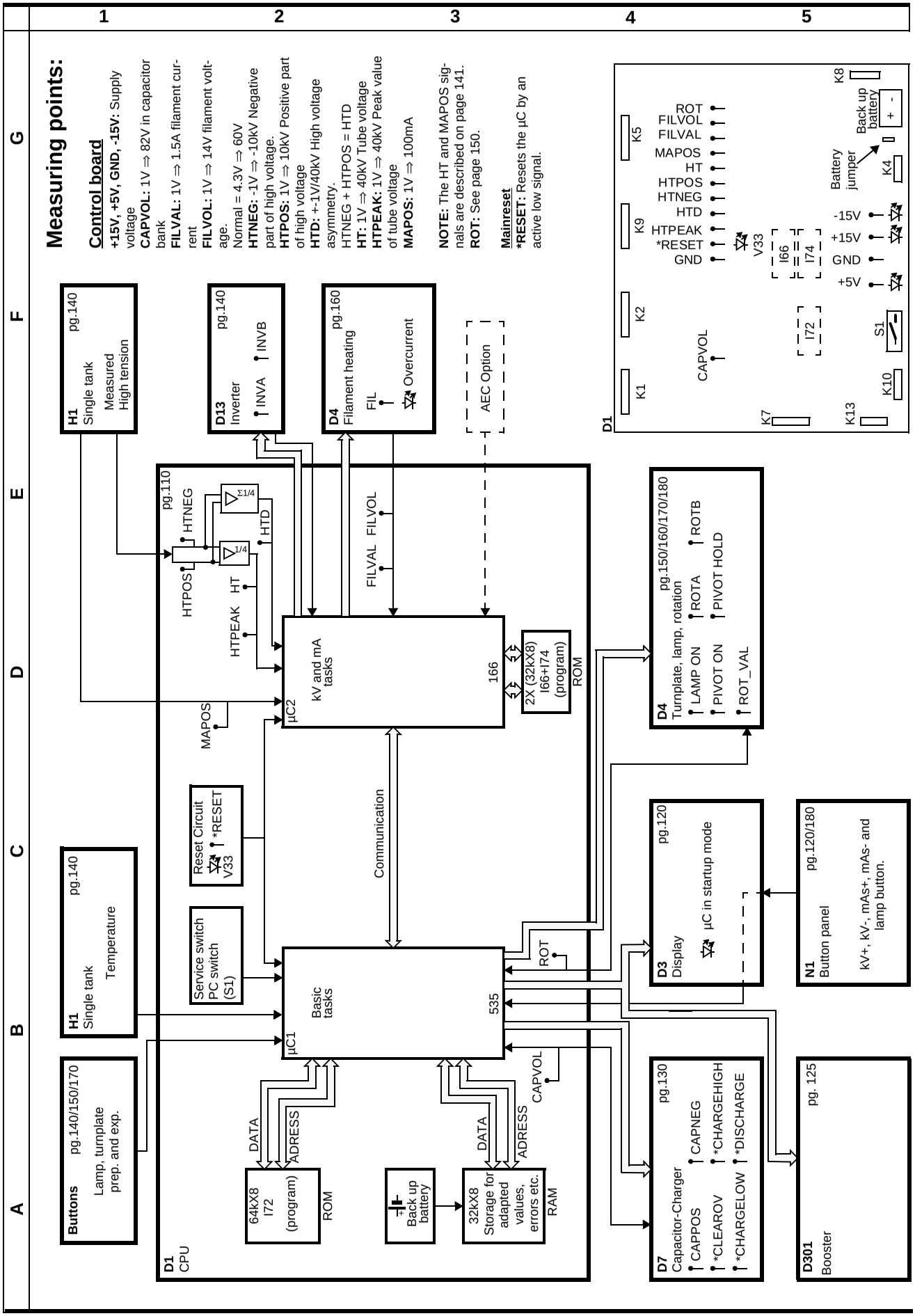
Measuring points

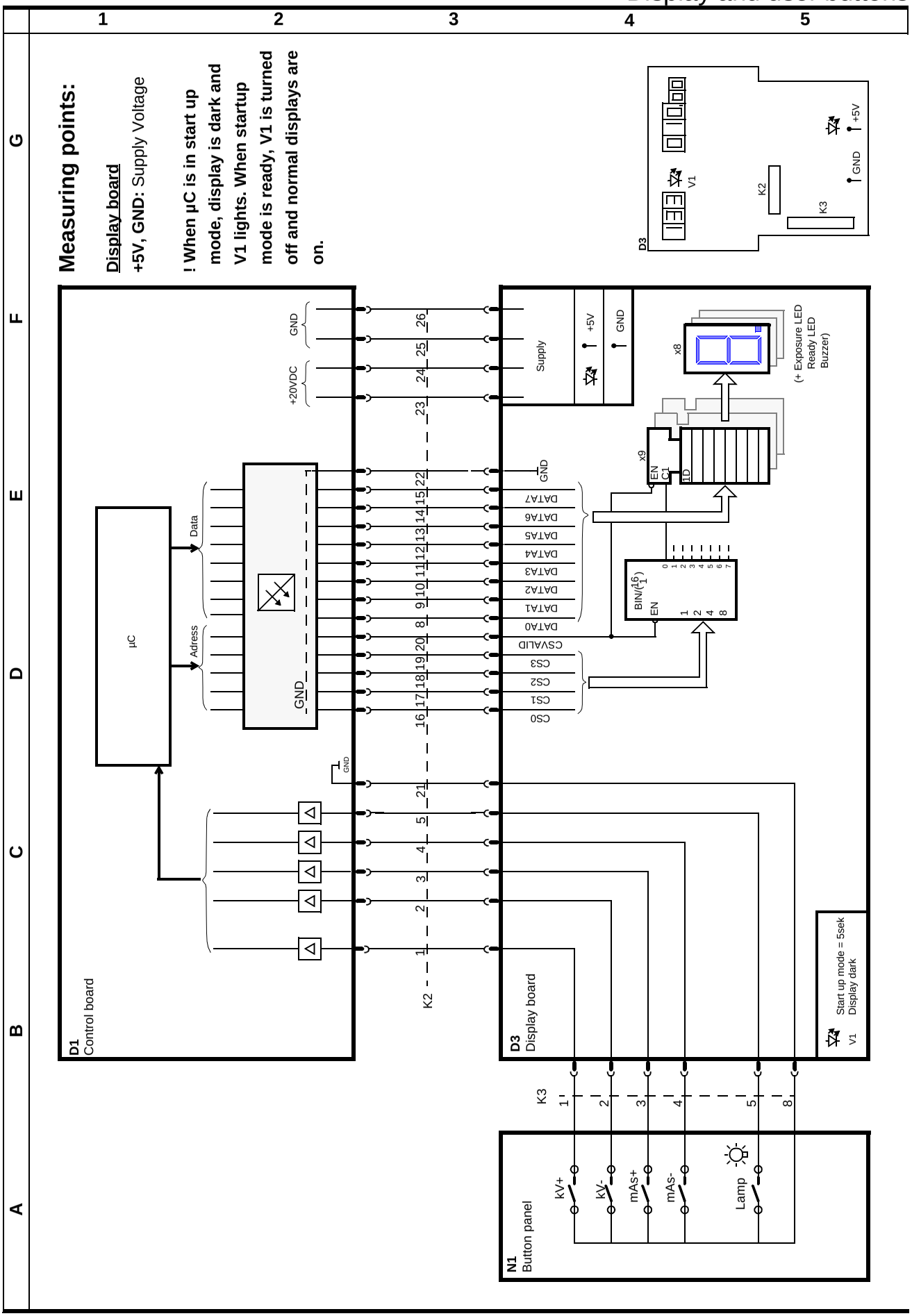
Name	PC-board	Page	Function
CAPNEG	D7	130	Negative side of capacitor pack
CAPPOS	D7	130	Positive side of capacitor pack
CAPVOL	D1	130	Voltage level in capacitor pack
CHARGEHIGH[2]	D7	130	Charge with high power level
CHARGELOW[2]	D7	130	Charge with low power level
CLEAROV[2]	D7	130	Reset overvoltage blocking
DISCHARGE[2]	D7	130	Discharge capacitor pack
FIL	D4	160	Trigger pulses to filament booster
FILVAL	D1	160	Current through filament transformer
FILVOL	D1	160	Supply voltage for filament heating
HT	D1	140	Tube voltage
HTD	D1	140	High tension asymmetry
HTNEG	D1	140	Negative part of high tension
HTPEAK	D1	140	Tube voltage peak value
HTPOS	D1	140	Positive part of high tension
INVA	D13	140	Trigger pulses to inverter
INVB	D13	140	Trigger pulses to inverter
LAMP ON	D4	180	Collimator lamp control
MAPOS	D1	140	Current through high tension unit. One part corresponds to the real tube current.
PIVOT ON	D4	170	Push turnplate down
PIVOT HOLD	D4	170	Hold turnplate down
RESET[2]	D1	110	Reset signal for up
ROT	D1	150	Tube anode speed
ROTA	D4	150	Trigger pulses to inverter for anode speed
ROTB	D4	150	Trigger pulses to inverter for anode speed
ROT_VAL	D4	150	Tube anode speed

Power	PC-board	Page	Function
+5V, +15V, -15V, GND	D1	110	---
+5V, GND	D3	120	---
+5V, +15V, GND	D4	150	---
100VDC, 100VDCRET[1]	D4	150	---
60VDC, 60VDCRET[1]	D4	160	---
+5V, +15V, GND	D7	130	---
+5V, +15V, GND	D13	140	---
+5V, +15V, +16.5, -15V, GND, TP_bat	D301	125	---

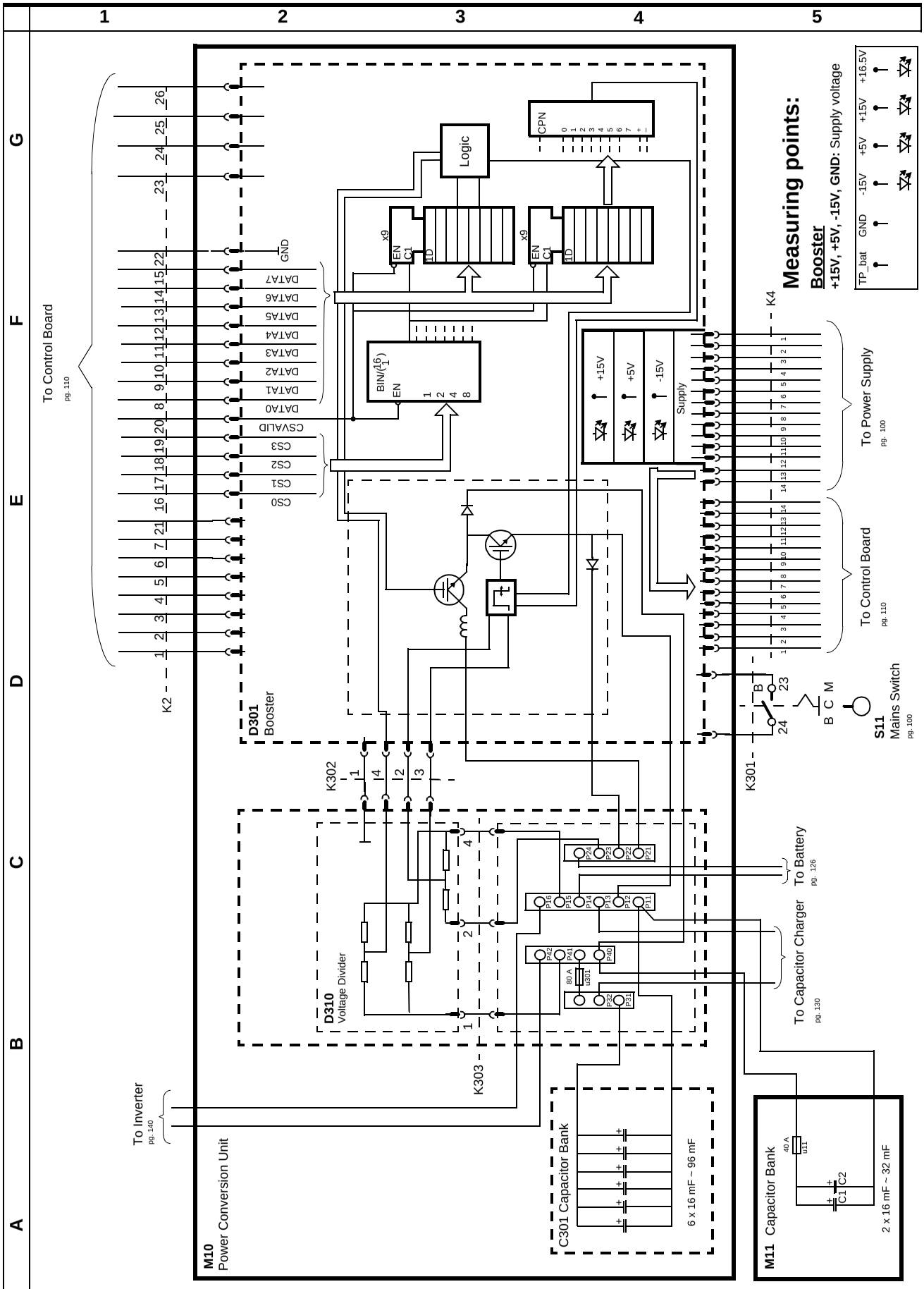
Notes!
1) 100VDCRET and 60VDCRET mean the "GND" side of the specified supply voltage
2) Active low function

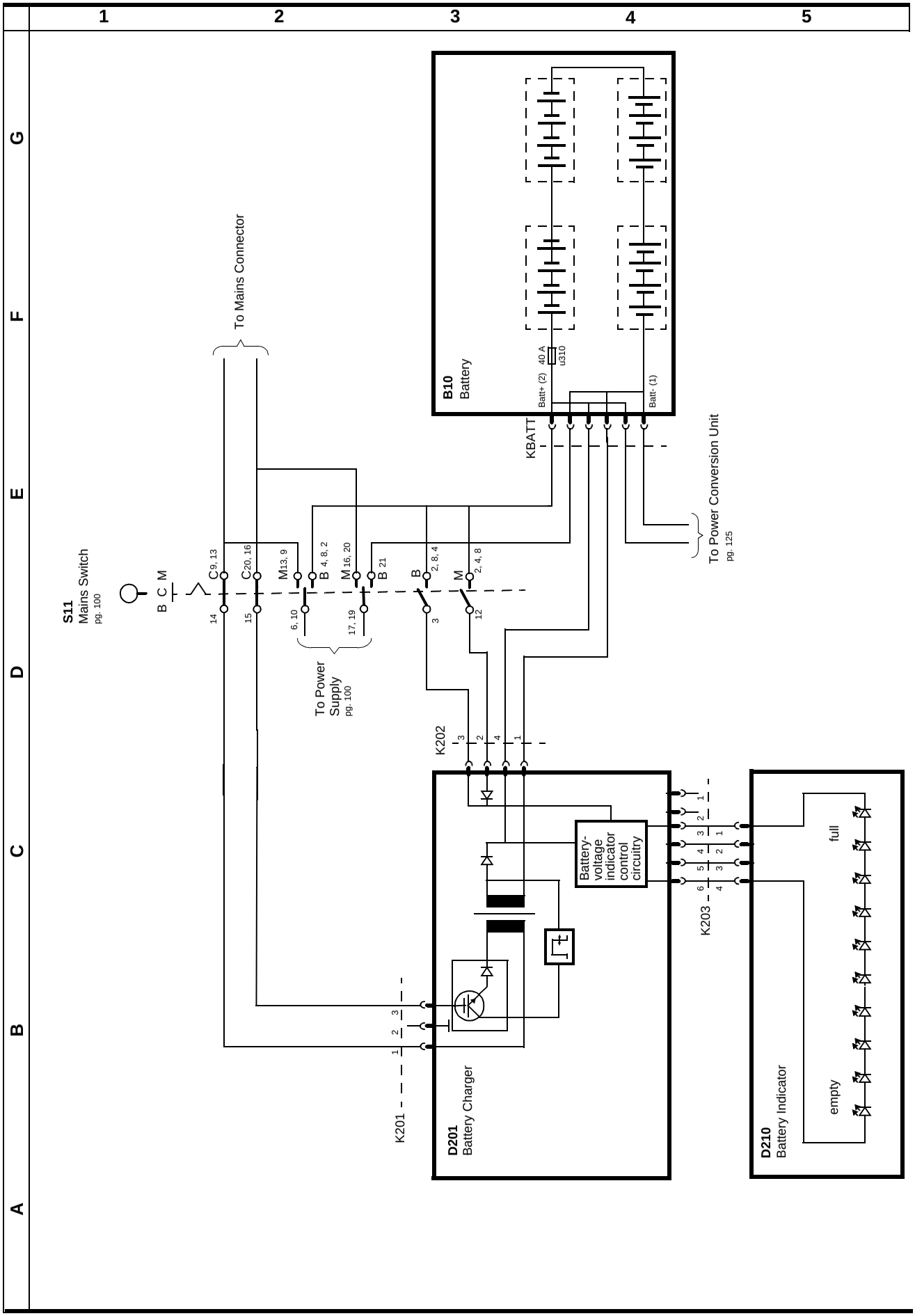

Destination
D1 +5V
D1 +15V
D3 +15V
D7 +15V
D13 +15V
D1 -15V
D301 Booster
D7 Charger
D4 Turnplate / Lamp
D4 Filament
D4 Rotation
K4
K55
K53
K53
7.6-8.4V=
19-21V=
19-21V=
380-420V=
20.9-23.1V~
5.7-6.3V~
57-63V=
95-105V=
u3 1AF
u2 1AF
u1 1AF
u8 2.5AF
u5 10A
u4 10A
u6 1.6AF
u7 5AF
D8
u Const.
GND
K52
S11 Mains switch
u9 10/15A
u10 10/15A
LC1
K51
L1
N
PE
battery +
battery -
To Battery Charger pg. 126
To Motor Power pg. 190
To Booster pg. 125
To Mains Plug
To Battery pg. 126

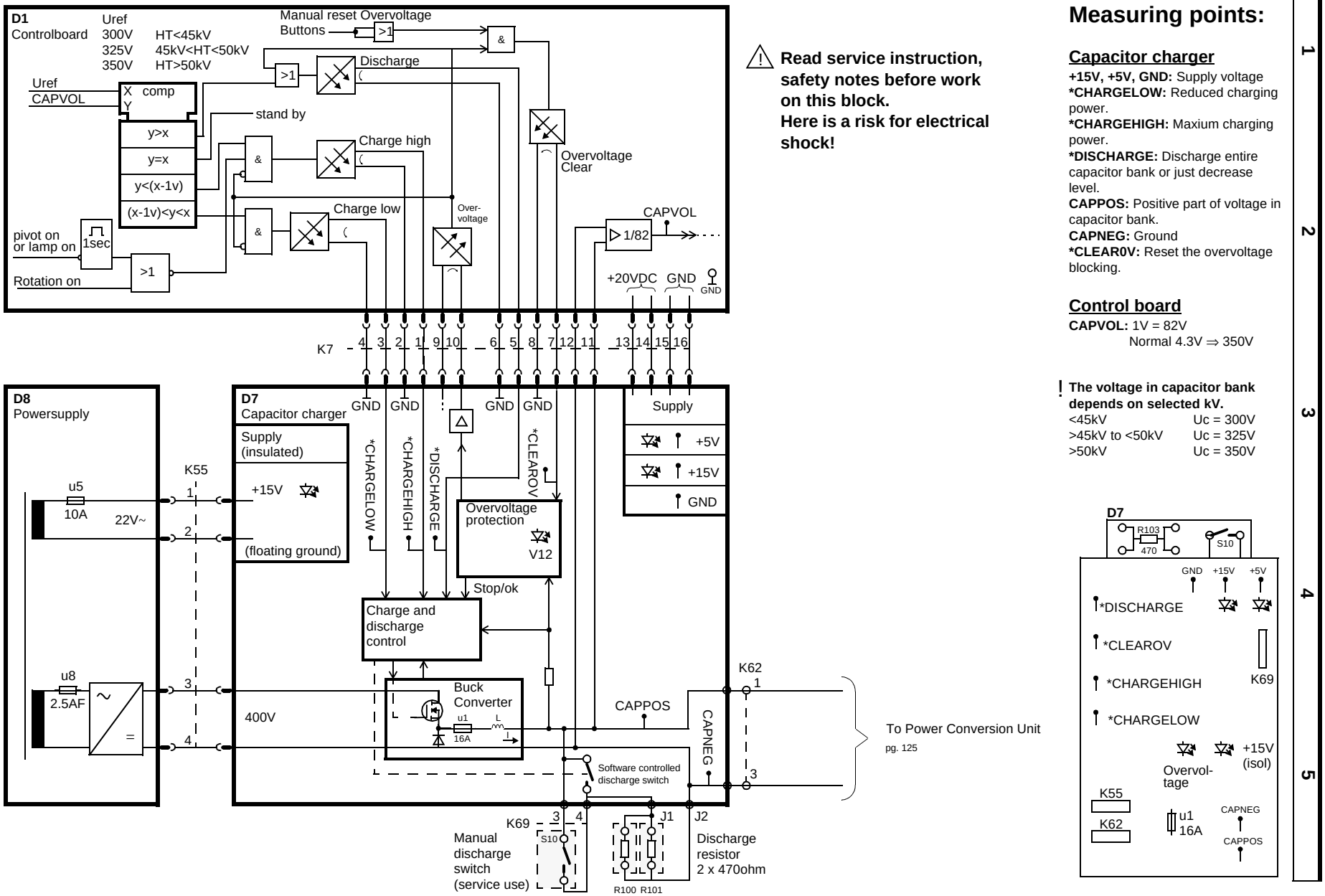

Measuring points:
Control board
+15V, +5V, GND, -15V: Supply voltage
CAPVOL: 1V ⇒ 82V in capacitor bank
FILVAL: 1V ⇒ 1.5A filament current
FILVOL: 1V ⇒ 14V filament voltage.
HTNEG: -1V ⇒ -10kV Negative part of high voltage.
HTPOS: 1V ⇒ 10kV Positive part of high voltage
HTD: +-1V/40kV High voltage asymmetry.
HTNEG + HTPOS = HTD
HT: 1V ⇒ 40kV Tube voltage
HTPEAK: 1V ⇒ 40kV Peak value of tube voltage
MAPOS: 1V ⇒ 100mA
NOTE: The HT and MAPOS signals are described on page 141.
ROT: See page 150.
Mainreset
*RESET: Resets the µC by an active low signal.
H1 Single tank Measured High tension pg.140
D13 Inverter INVA INVB pg.140
D4 Filament heating FIL Overcurrent pg.160
AEC Option
D1
K1 K2 K5 K9 K10 K13 K7 K8
CAPVOL
ROT FILVOL FILVAL MAPOS HT HTPOS HTNEG HTD HTPEAK *RESET GND
V33 I66 I74 I72 S1
-15V +15V GND +5V
Battery jumper
Back up battery
pg.110
HTNEG HTD HTPOS HTPEAK HT
Σ1/4 1/4
FILVAL FILVOL
µC2 kV and mA tasks 166
2X (32KX8) I66+I74 (program) ROM
MAPOS
D4 Turnplate, lamp, rotation pg.150/160/170/180
LAMP ON ROTA ROTB PIVOT ON PIVOT HOLD ROT_VAL
Reset Circuit V33 *RESET
Service switch PC switch (S1)
Communication
H1 Single tank Temperature pg.140
µC1 Basic tasks 535
ROT
D3 Display µC in startup mode pg.120
N1 Button panel kV+, kV-, mAs+, mAs- and lamp button. pg.120/180
Buttons Lamp, turnplate prep. and exp. pg.140/150/170
DATA ADRESS 64kX8 I72 (program) ROM
Back up battery
DATA ADRESS 32kX8 Storage for adapted values, errors etc. RAM
CAPVOL
D7 Capacitor-Charger CAPPOS *CLEAROV *CHARGELOW CAPNEG *CHARGEHIGH *DISCHARGE pg.130
D301 Booster pg. 125
D1 CPU
1 2 3 4 5
A B C D E F G


Measuring points:
Display board
+5V, GND: Supply Voltage
! When µC is in start up mode, display is dark and V1 lights. When startup mode is ready, V1 is turned off and normal displays are on.
D1
Control board
µC
Data
Adress
GND
+20VDC
D3
Display board
Supply
+5V
GND
x8
(+ Exposure LED
Ready LED
Buzzer)
x9
BIN/(16)
DATA0
DATA1
DATA2
DATA3
DATA4
DATA5
DATA6
DATA7
CSVALID
CS0
CS1
CS2
CS3
K2
K3
N1
Button panel
kV+
kV-
mAs+
mAs-
Lamp
Start up mode = 5sek
Display dark
V1

Power Conversion Unit




1
2
3
4
5
A
B
C
D
E
F
G
B10
Battery
Batt+ (2)
40 A
u310
Batt- (1)
KBATT
To Mains Connector
To Power Conversion Unit
pg. 125
S11
Mains Switch
pg. 100
B C M
C9, 13
C20, 16
M13, 9
B 4, 8, 2
M16, 20
B 21
B
2, 8, 4
M
2, 4, 8
14
15
6, 10
17, 19
3
12
To Power Supply
pg. 100
K202
3
2
4
1
Battery-voltage indicator control circuitry
K203
6
5
4
3
2
1
full
empty
D210
Battery Indicator
K201
1
2
3
D201
Battery Charger



Read service instruction, safety notes before work on this block.
Here is a risk for electrical shock!

Measuring points:

Capacitor charger

+15V, +5V, GND: Supply voltage
***CHARGELOW:** Reduced charging power.
***CHARGEHIGH:** Maxium charging power.
***DISCHARGE:** Discharge entire capacitor bank or just decrease level.
CAPPOS: Positive part of voltage in capacitor bank.
CAPNEG: Ground
***CLEAR0V:** Reset the overvoltage blocking.

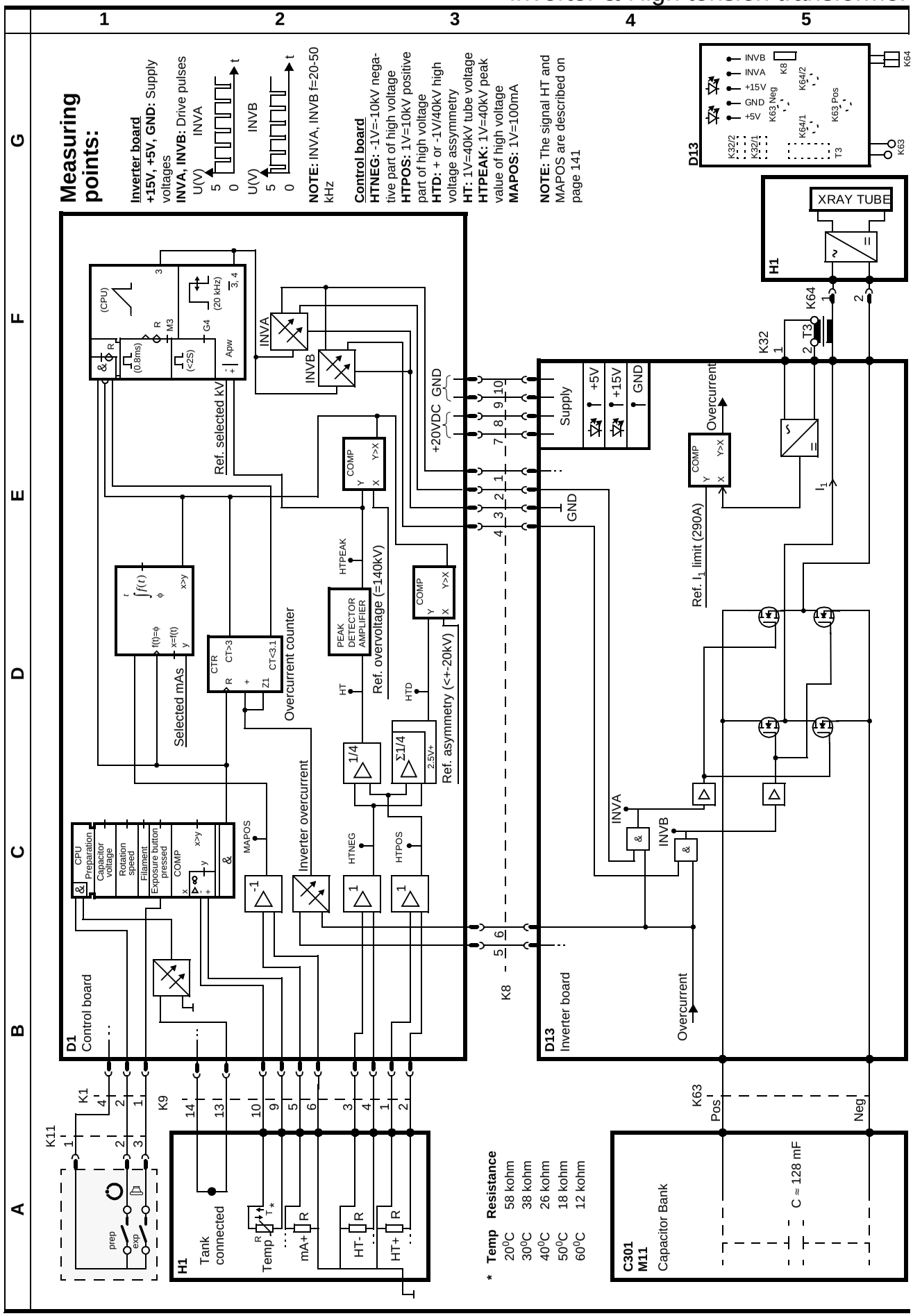
Control board

CAPVOL: 1V = 82V
Normal 4.3V ⇒ 350V

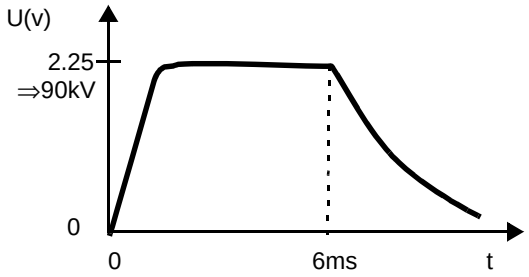
! The voltage in capacitor bank depends on selected kV.

<45kV	Uc = 300V
>45kV to <50kV	Uc = 325V
>50kV	Uc = 350V

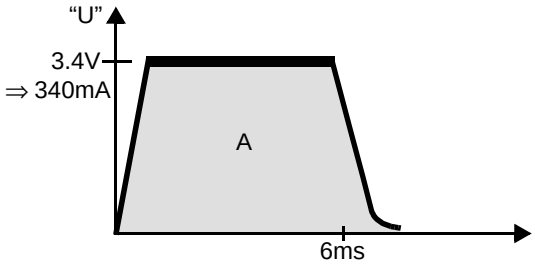
Inverter & High tension transformer



Example: Exposure results 90kV 2.0mAs measured on D1



HTPEAK (1V ⇒ 40kV)



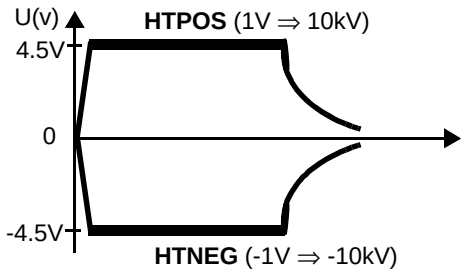
MAPOS (1V ⇒ 100mA)

Calculating mAs

mAs = current x exposure time

mAs = 340mA x 0.006s = 2.0mAs

NOTE: The signal contains high frequency 20-40 kHz and can cause sampling problems (Aliasing effect)

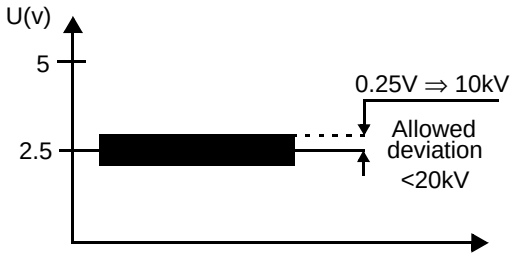


HTPOS (1V ⇒ 10kV)

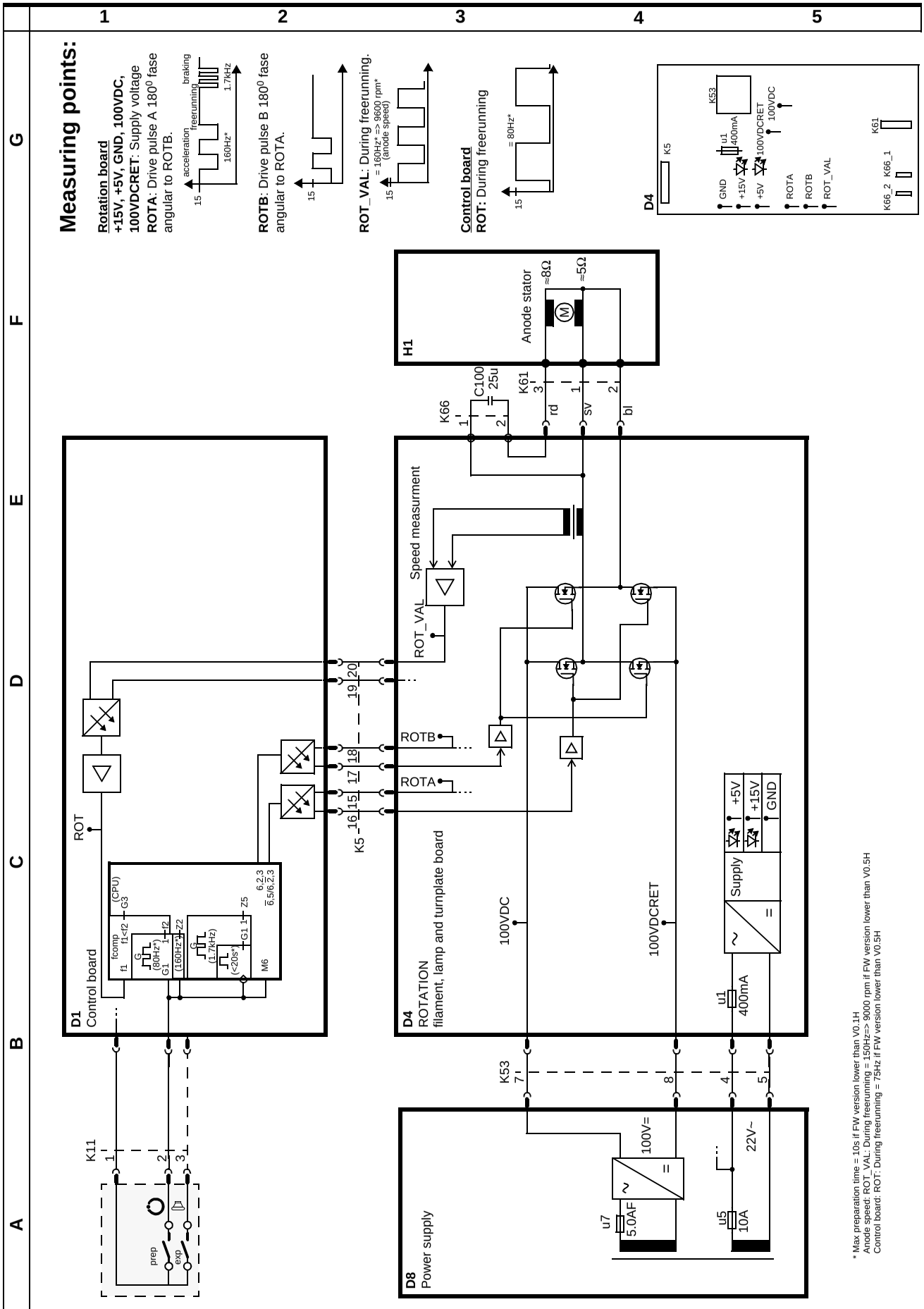
HTNEG (-1V ⇒ -10kV)

HTPOS-HTNEG = 4.5-(-4.5) = 9V

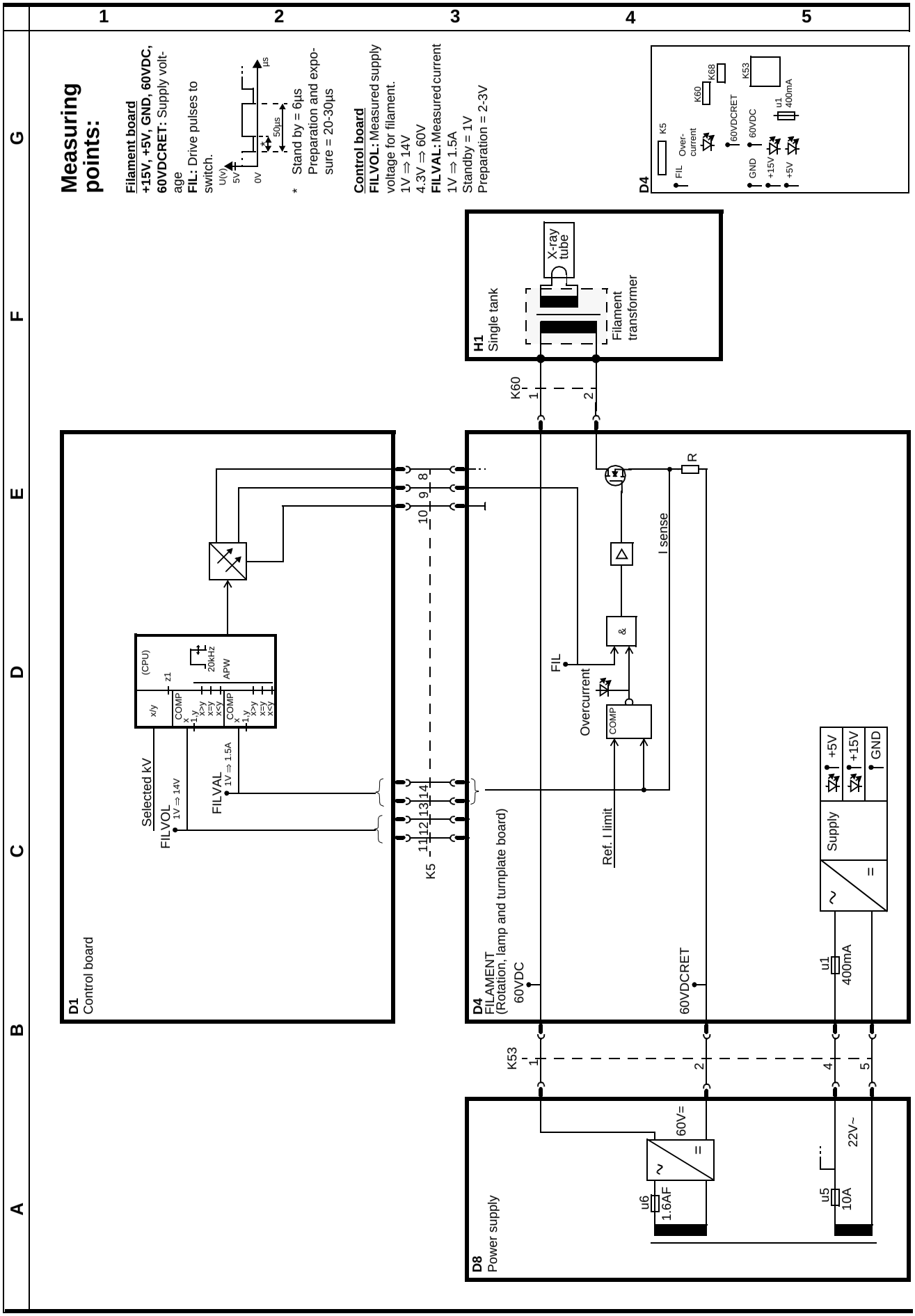
9V ⇒ 90kV

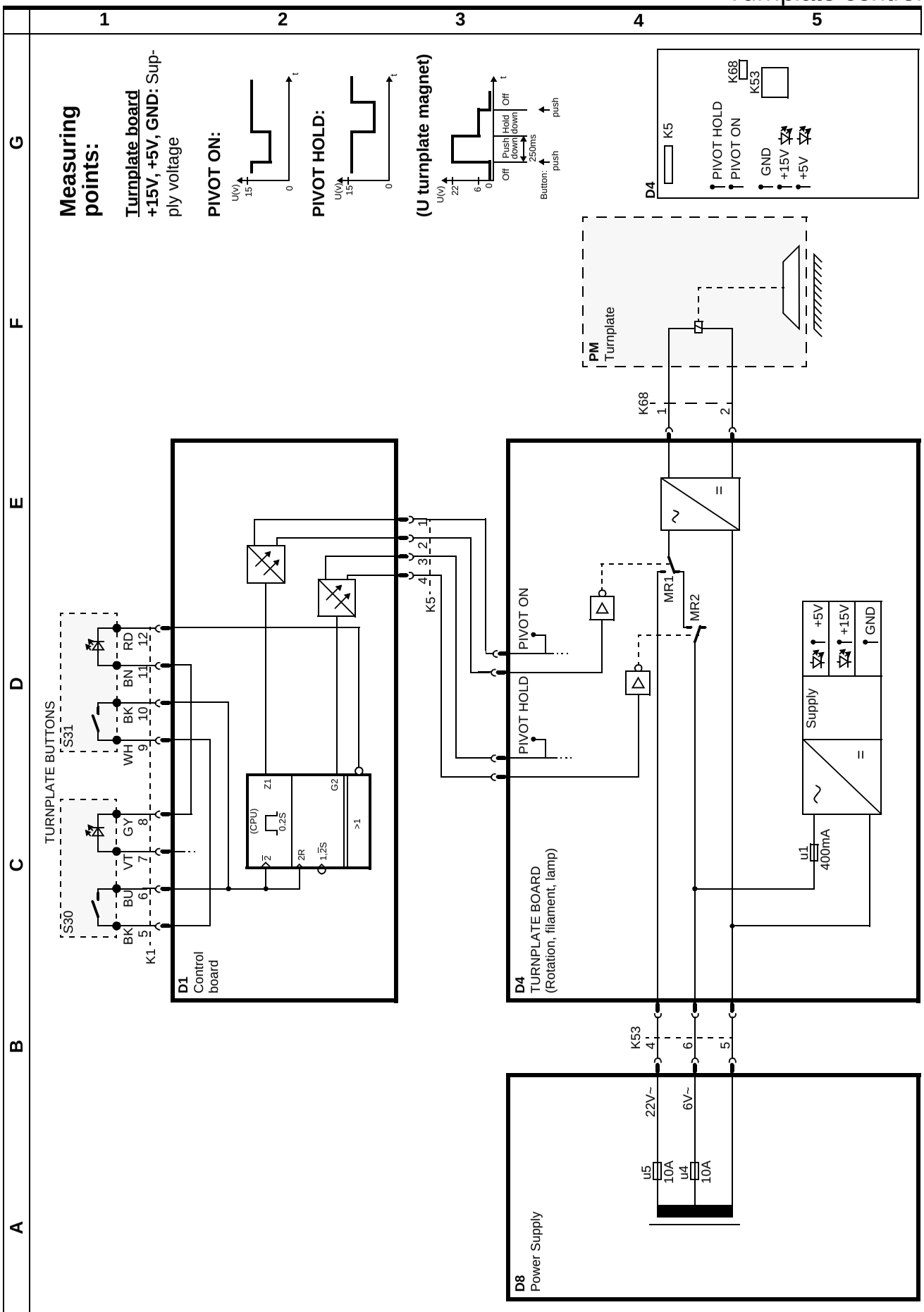


HTD (1V ⇒ 40kV)

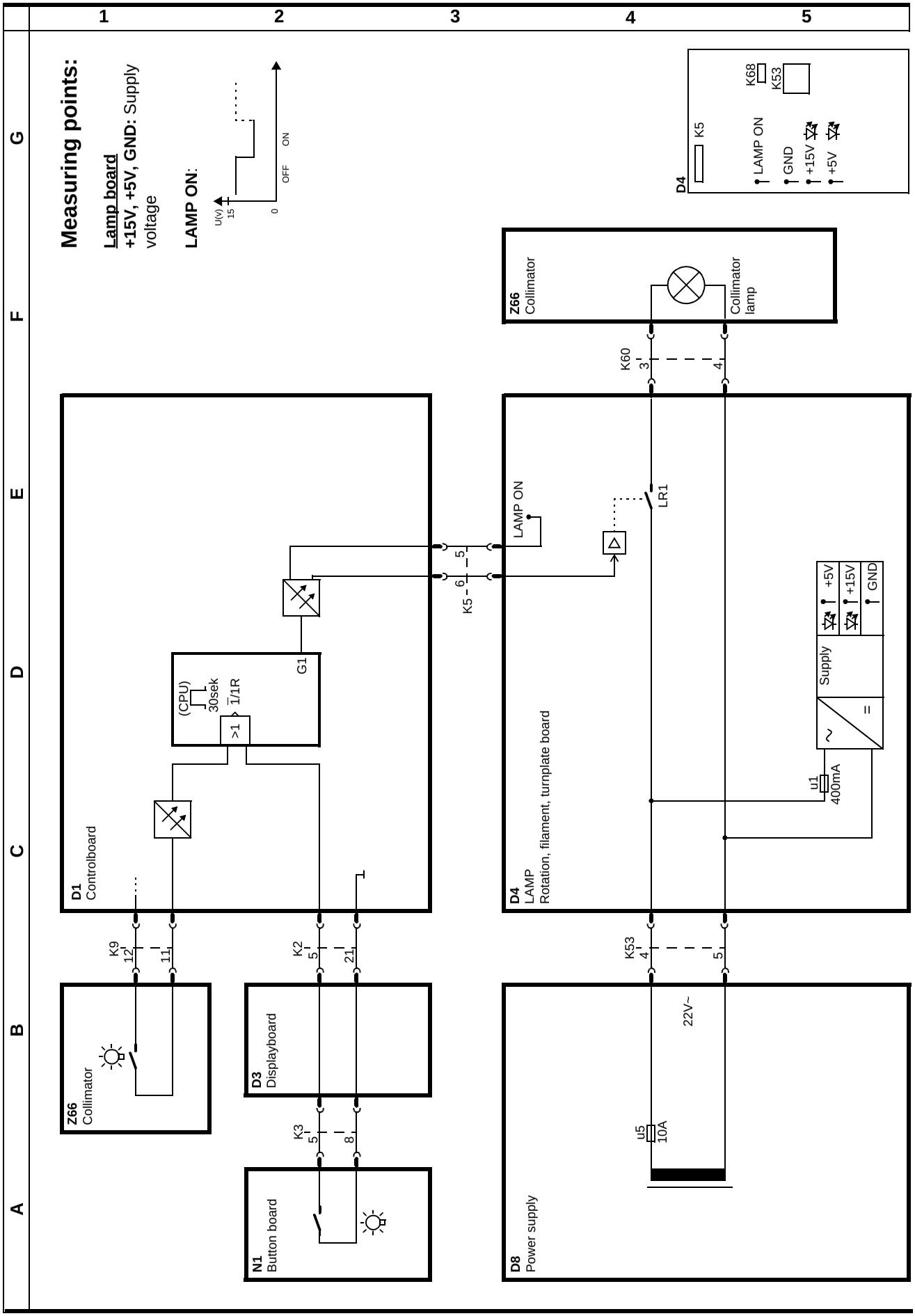

Measuring points:
Rotation board
+15V, +5V, GND, 100VDC, 100VDCRET: Supply voltage
ROTA: Drive pulse A 180⁰ fase angular to ROTB.
ROTB: Drive pulse B 180⁰ fase angular to ROTA.
ROT_VAL: During freerunning. = 160Hz* => 9600 rpm* (anode speed)
Control board
ROT: During freerunning
D4
K5
K53
u1 400mA
100VDC
100VDCRET
GND
+15V
+5V
ROTA
ROTB
ROT_VAL
K61
K66_2
K66_1
H1
Anode stator
≈8Ω
≈5Ω
C100 25u
K66
K61
rd
sv
bl
Speed measurment
ROT_VAL
ROTB
ROTA
K5
D1
Control board
ROT
fcomp
f1<f2
G3
(CPU)
G1
f1
f2
Z2
Z5
M6
6,2,3
6,5/6,2,3
D4
ROTATION
filament, lamp and turnplate board
100VDC
100VDCRET
Supply
u1
400mA
K53
D8
Power supply
100V=
22V~
u7
5.0AF
u5
10A
K11
prep
exp
* Max preparation time = 10s if FW version lower than V0.1H
Anode speed: ROT_VAL: During freerunning = 150Hz=> 9000 rpm if FW version lower than V0.5H
Control board: ROT: During freerunning = 75Hz if FW version lower than V0.5H

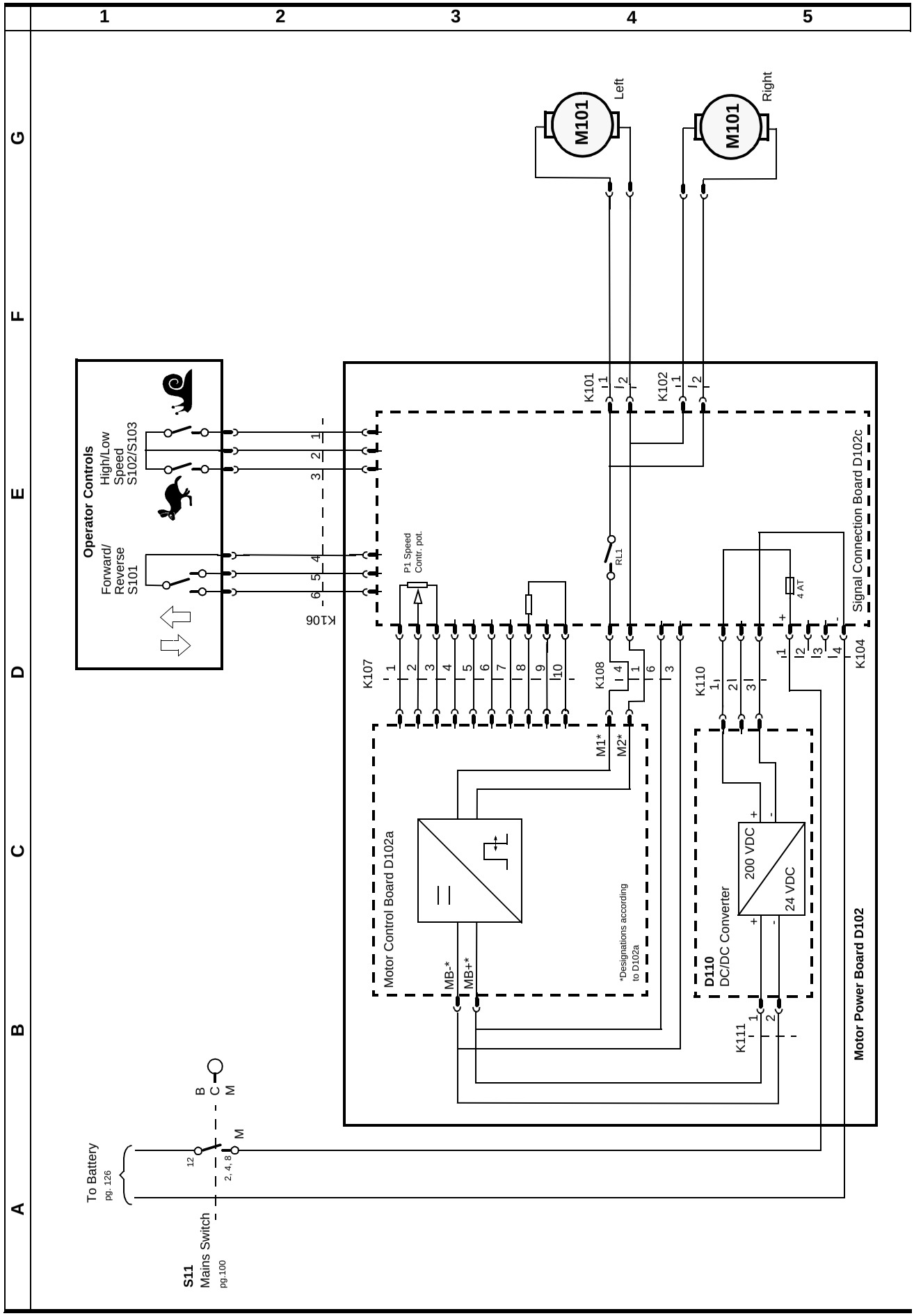
Filament heating




Measuring points:
Turnplate board
+15V, +5V, GND: Supply voltage
PIVOT ON:
PIVOT HOLD:
(U turnplate magnet)
Button: push
D4
K5
PIVOT HOLD
PIVOT ON
GND
+15V
+5V
K68
K53
PM
Turnplate
K68
1
2
TURNPLATE BUTTONS
S31
S30
RD 12
BN 11
BK 10
WH 9
GY 8
VT 7
BU 6
BK 5
K1
D1
Control board
(CPU)
Z1
G2
0.2S
2R
1.2S
>1
K5
4 3 2 1
PIVOT ON
PIVOT HOLD
MR1
MR2
Supply
+5V
+15V
GND
u1
400mA
D4
TURNPLATE BOARD
(Rotation, filament, lamp)
K53
4
6
5
22V~
6V~
u5
10A
u4
10A
D8
Power Supply

Lamp control




1
2
3
4
5
A
B
C
D
E
F
G
M101
Left
M101
Right
K101
K102
Operator Controls
High/Low Speed S102/S103
Forward/ Reverse S101
K106
P1 Speed Contr. pot.
RL1
4 AT
Signal Connection Board D102c
K104
K107
K108
K110
M1*
M2*
Motor Control Board D102a
MB-*
MB+*
*Designations according to D102a
D110
DC/DC Converter
200 VDC
24 VDC
K111
Motor Power Board D102
To Battery
pg. 126
12
2, 4, 8
B
C
M
M
S11
Mains Switch
pg.100